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Immigrant Mental Health and Unemployment

Steven Kennedy

SEDAP Research Paper No. 92

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SEDAP Research Paper No. 92

February 2003

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Immigrant Mental Health and Unemployment

Steven Kennedy[a]

December 2002

Abstract

The objective of this research is to assess whether stress associated with the transition to a new country combined with additional stress arising from unemployment affects the mental health of immigrants. I use the Longitudinal Survey of Immigrants to Australia (LSIA) to examine the effect of labour force status on the mental health of immigrants. By using a rich longitudinal data set, I am able to control for individual immigrant differences whilst examining whether changes in mental health cause changes in labour force status rather than changes in labour force status causing changes in mental health. I find that causality runs from unemployment to mental health and that unemployment significantly adversely affects the mental health of immigrants. Other characteristics associated with poor mental health include; age, gender, visa category, marital status and educational attainment.

Keywords: Immigrants, Mental Health, Unemployment

JEL: I12, J69

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1. Introduction

> *It is apparent from studies in Australia and overseas that migration itself does not necessarily threaten mental health. The mental health status of immigrants and refugees becomes a concern when additional risk factors (pre-migration and post-migration factors) combine with the stresses of migration (Jayasuriya et al., 1992).*

The impact of unemployment on the mental health of immigrants is an essential piece of information for policy makers who seek to improve the welfare of all citizens and reduce the potential for increased health care costs. This paper examines the effect of labour force status in particular, unemployment, on the mental health of Australian immigrants. The paper explores whether the stresses associated with the transition to a new country (or culture) combined with additional stress arising from unemployment affects the mental health of immigrants.

How the labour market experience of immigrants affects their health is particularly relevant to Australian policy makers. In Australia, all non-humanitarian immigrants pay a bond from which monies will be deducted should they draw on the social security system in the first two years after migration. After two years, the bond or remaining portion of the bond is returned to the immigrant or the individual that put up the bond on the immigrant's behalf. All immigrants to Australia have full access to the public health care system and no bond applies. If the labour market experience of immigrants in the first two years of migration leads to health problems, and there are barriers to avoiding adverse labour market experiences, this may have important social as well as health care cost consequences.

There is a small literature that explores the mental health of immigrants. Studies have typically focused on the incidence of psychiatric illness amongst immigrants for example,

examining the incidence of depression or schizophrenia in immigrant populations.[1] Fewer studies have focused on the transition experience of immigrants. That is, changes in the mental health of immigrants in the period immediately following migration. Here the interest is not so much in what is the incidence of a particular psychiatric disease it is in how well do immigrants adapt to their new environment. For example, Kuo *et al*., (1986) examined the impact of social support networks on the transition experiences of immigrants and found that social networks were important influence on mental health. This paper focuses primarily on the transition experience of immigrants and uses a well-known psychiatric evaluation instrument to measure mental health. A major contribution of this paper is that both the transition experience of immigrants and the relationship of mental health to key individual and socio-economic characteristics are examined.

There is also a literature that explores the effect of unemployment on mental health or well-being (see for example, Clark and Oswald, 1994; Flatau *et al*., 1998; Theodossiou, 1998; Warr, 1987). In general, this literature finds that the unemployed have poorer mental health compared to those whom are employed. The relationship between unemployment and mental health depends in part on individual characteristics and the duration of unemployment.

This paper takes an informal theoretical approach (similar too much of the unemployment mental health literature) in identifying causal links between labour force status and mental health. An important aspect of this paper is that the longitudinal data set upon which this analysis is based enables a more careful examination of the issue of causality then can be performed using a cross-section.

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[1] For a review of Australian studies see Jayasuriya *et al*., 1992.

Sections 2.1 and 2.2 of the paper briefly examine the existing literature on unemployment, immigration and mental health. Section 3 discusses the data set and presents some descriptive results. In section 4, a number of regression models and associated results are presented and discussed. Section 5 concludes with a discussion of key results and implications for public health policy.

2. Unemployment, Immigrants and Mental Health Literature

2.1. Unemployment and Mental Health

There are a number of good reviews of the unemployment and mental health literature (for example, Flatau *et al*., 1998; Ezzy, 1993; Warr *et al*., 1988; Jahoda, 1988). In general, this literature concludes that unemployment, compared to employment, is associated with poor mental health. It is not my intention to repeat this work; instead I focus on the theoretical underpinning of this literature and relevant empirical studies.

Most studies of the effect of unemployment on mental health are in what Clark and Oswald (1994) describe as the psychologists' tradition.[2] That is, researchers use broad descriptive models to represent the effects of different stresses on individuals. Psychologists have developed many sophisticated models of stress and there are a number of different psychological models through which behaviour can be interpreted. The psychological or behavioural model underlying most unemployment mental health studies appears to be a simple model of stress or perhaps more accurately chronic stress. According to Talyor *et al* (1997), Seyle (1956) first discussed the effect of chronic stress on health in his articulation of the General Adaptation Syndrome. The General Adaptation Syndrome is a model of stimulus

[2] See Jahoda (1988) and Theodossiou (1998) for a discussion of why studies in this area have tended to be descriptive rather than directed by economic theory.

– resistance – exhaustion. Seyle suggested repeated cycling through these phases would lead to health problems. Models similar to that suggested by Seyle (1956) and other psychologists are starting to find their way into the economic literature (see for example, Smith, 1999).

The theoretical focus of the unemployment mental health literature has not been on particular behavioural models of stress but rather on why unemployment stresses the individual. Flatau *et al*., (1988) notes that Jahoda (1982) and (1992) further developed the theoretical basis of her work by relating how the unemployment experience equates to the deprivation of positive influences associated with work, which are argued to include income, social contact and structured time. Deprivation of the positive aspects of work even in comparison to poorly paid work is also a feature of other authors' work (for example, Theodossiou, 1998).

Warr's (1987) Vitamin model is a more elaborate model of why unemployment stresses individuals. This model treats different aspects of the work environment as if they were vitamins contributing towards mental health. In this model an excess of some aspects of work can be deleterious to mental health in the same way too much of some vitamins can adversely affect physical health. Similarly, too little (deprivation) of some aspects of work through unemployment will also adversely affect mental health. The Vitamin model carefully reflects the notion of equilibrium that is present in most behavioural models of stress. That is, people need stimulation through work but not too much and not too little.[3]

A nice illustration of how individual health states are built around equilibrium is in Warr's (1988) paper in which he discusses the adaptation of individuals to a long duration of unemployment. Warr (1988) proposes that there is a inverted U shaped response to a duration

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[3] As Seyle in Kutash *et al* (1980) points out "complete freedom from stress is death". That is, not all stress is bad; there is some healthy level of stress (or stimulation) at which people function optimally.

of unemployment where initially stress levels rise (mental health declines), followed by a period of higher sustained stress (further decline in mental health) followed in turn by adaptation to unemployment and an increase in mental health. However, this final (equilibrium) level of mental health is still below the pre-unemployment mental health level.

Other studies have also found evidence of mental health adaptation to labour market shocks for example, Kasl *et al*., (1975) examined individuals' health in firms that were about to close down and the effect of different social support networks on mental health. Differences in social networks were isolated through a rural/urban differentiation where it was assumed that social networks would be stronger in the rural setting. Kasl *et al*., (1975) found that stress levels were highest in the anticipatory phase of firm shutdown (prior to actual unemployment) and there was some evidence that the stress of unemployment was alleviated for individuals with stronger support networks.

The role of economic theory in the unemployment and mental health literature is small. Some authors have displayed a clear preference not to incorporate existing economic theory suggesting that a descriptive based approach is most appropriate (see Jahoda, 1988 and Theodossiou, 1998). Clark and Oswald (1994), whilst adopting a psychological (stress based) approach interpret their results in a utility framework. They treat a decline in mental health as an indicator of a person's utility; thus when they observe that poorer mental health is associated with unemployment they infer that unemployment is primarily an involuntary phenomena with an associated reduction in utility. Flatau *et al*., (1998) notes that Grossman's (1972) model of health capital is an economic model whereby unemployment might be related to mental health (or health more generally). In this model, an episode of unemployment could be treated as a negative shock to health investment or acceleration in the depreciation of the stock of health.

2.2. Immigrants and Mental Health

Studies of the mental health of immigrants have tended to focus on the incidence of mental illnesses such as schizophrenia and major depression in immigrant populations usually comparing this to the incidence of mental illness in native populations. Jayasuriya *et al*., (1992) review Australian studies of the mental health of immigrants and found that it was difficult to draw conclusions about the relative health of immigrants compared to other Australians. Vega and Rumbaut (1991) reviewed US studies of the mental health of ethnic minorities and found mixed evidence for a higher incidence of mental illnesses.[4] The US studies were mostly epidemiological in approach and used instruments similar to instrument used in this study to measure mental illness.

Longitudinal studies of the transition experience of immigrants have found that immigrants typically adjust to their new country in an approximate three year cycle of euphoria, disenchantment, and finally acceptance or equilibrium see for example, Rumbaut (1985), Portes and Rumbaut (1989), and Ying (1988) (as cited in Vega and Rumbaut, 1991). The pace of adjustment is affected by a number of factors including: the ability to speak the adopted country's language, social support mechanisms, family issues and the situation from which the immigrant has come (for example, immigrants leaving a stressful situation for humanitarian reasons have been found to be more anxious in their new environment than immigrants leaving a less stressful situation).

Kuo *et al*., (1986) examined the impact of different social networks on immigrants well being and found that ethnic support networks can play an important role in promoting

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[4]Vega and Rumbaut (1991) noted that the recorded high incidence of mental illnesses in some ethnic groups could be because a large proportion of these ethnic groups are part of lower socioeconomic groups with these groups being more likely to experience mental illness.

immigrant mental health. The role of the family is central in most support networks, particularly where family members or relatives have sponsored an immigrant.

The behavioural model underlying studies of the mental health of immigrants appears to be a model of stress (similarly to the literature on unemployment and mental health) where immigration or factors associated with immigration stress the individual. Vega and Rumbaut (1991) noted that most research on whether there are inherent features of minorities (including immigrant minorities) that cause mental illness is "guided by social psychological stress theory". This theory suggests that life stresses are more significant and numerous for minority groups. The concepts of alienation and conflicts of cultural practise feature strongly in the immigration mental health literature as sources of stress. This literature also highlights the affect of pre-migration stresses such as persecution and torture on the transition experience of refugees (see for example, Krupinski *et al*., 1986).

This paper examines the impact of a variety of stressors on the mental health of Australian immigrants. Through control of key individual characteristics I am able to identify the effect of important post-migration stresses. Thus I am also able to follow the experience of a diverse groups of immigrants whilst being able to control for this diversity in my analysis. Few other studies have been able to compare directly the post-migration experiences of very different migrants. As the data set used here is representative of all Australian immigrants in a particular period the results are able to be generalised to a much larger group than is typically possible in other studies.

3. Data

The Longitudinal Survey of Immigrants to Australia (LSIA) first collected information from 5192 principal applicant immigrants and their spouses commencing in March 1994 (approximately 6 months after arrival).[5] Of the 5192 principal applicants, 1837 had spouses. The LSIA was designed to be representative of the principal applicant immigrant population arriving in Australia in the period September 1993 to August 1995 (approximately 75,000 people). Waves 2 and 3 of the survey were subsequently collected commencing in March 1995 (approximately 18 months after arrival) and then again in March 1997 (approximately 42 months after arrival). In wave 3, 3752 of the original 5192 principal applicants where able to be interviewed. See Appendix C for a discussion of attrition in this data set.

The focus of this paper is on all (adult) immigrants. All immigrants include the 5192 principal applicants and 1837 spouses of principal applicants. After excluding those who did not respond to all 12 mental health questions there was 6889 immigrants in wave 1. Household income, number of children and visa category data were only collected from principal applicants, with all other information being collected from principal applicants and their spouses via separate personal interviews.

All variables of interest and their definitions are listed in Table 1. The measure of mental health used in this study was the 12-question version of the General Health Questionnaire (GHQ). The 12 questions that comprise the GHQ are presented in Appendix A. The GHQ was primarily developed in the UK in the 1960 and 1970s and has been used in numerous studies mainly as an instrument for "detecting psychiatric disorders" see Goldberg (1972), (1988). The GHQ has been widely tested, used in many countries and is considered

[5] The survey and associated data sets are maintained and released by the Australian Department of Immigration and Multicultural Affairs (DIMA).

to be an instrument largely free of cultural biases (see Bowling, 1991). Argyle (1989) as cited in Oswald and Clark (1994) suggests that the GHQ is a very good measure of psychological disadvantage. The GHQ has also been validated for Australian populations by Tennant (1977) and found to be an "efficient, reliable and valid index of non-psychotic psychological impairment".

There are primarily two ways to code responses to the GHQ. First, using a Likert scale where the four possible responses to each question are coded 0, 1, 2 or 3. In this scale 0 corresponds to a good outcome and 3 to a bad outcome. Second, using binary scoring where responses are scored 0, 0, 1, 1. In this case 0 scores correspond to the two better health responses and 1 scores correspond to the two feeling worse (bad) responses.[6] Using binary scoring the minimum GHQ score a person can obtain is 0 and the maximum is 12. I primarily use binary scoring in this study. However, I also present in appendices the mean GHQ scores based on the Likert scale.

In many studies a benchmark GHQ score is adopted. Scores above the benchmark indicate a higher probability of psychiatric disorder or psychological disadvantage. This is known as a 'caseness' score as the benchmark score corresponds to those found in typical psychiatric cases. The benchmark commonly used for the 12 question GHQ is 2. This benchmark is designed to indicate the presence of minor or major psychological impairment and is adopted in this study.

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[6] Binary scoring has the advantage that "it eliminates errors due to 'end users' and 'middle users', since they will score the same irrespective of whether they prefer Columns 1 and 4 or Columns 2 and 3" (Goldberg, 1972).

In the analysis that follows I only report the results for binary scoring. Results that were generated using a Likert scored GHQ were very similar and are not presented.

3.1 Descriptive Features of the Data

In the following section I discuss differences in means and GHQ caseness score proportions primarily for comparison with other studies. Regression results presented in section 4 confirm in a multivariate context the reported differences in means and proportions.

GHQ mean and caseness (the percentage of respondents scoring 2 or more) scores for each wave are presented by gender, age, labour force status and visa category in Tables 2 and 3. GHQ mean and caseness scores for other variables of interest are presented in Appendix B Tables B.1 and B.2. GHQ mean and caseness scores were higher for all groups in wave 1 than in wave 2 and wave 3 indicating that psychological disadvantage is on average worse for immigrants 6 months after arrival in Australia than at 18 months and 42 months. Whilst the pattern of adjustment observed in other studies of euphoria, disenchantment and acceptance is not observed it is possible that the initial period of euphoria observed in other studies has passed before immigrants are surveyed in this study.

Table 1

Variable Definitions

Variable	Definition
General Health Questionnaire	Persons answer 12 questions related to their mental health. The questionnaire is presented in Appendix A.
Age	Age is defined in two ways as a continuous variable or in 10-year age groups.
Gender	The dummy variable in regressions is (Males=0, Females=1)
Labour force status	Persons are asked which category best describes their current main activity. Answers are coded into three groups: employed, unemployed or out of the labour force. People who report their main activity as wage and salary earner, conducting own business but not employing others, conducting own business and employing others, other employed are coded employed. People who report their main activity as unemployed looking for full time work or unemployed looking for part time work are coded unemployed. People who report their main activity as student, home duties, retired, aged pensioner, other pensioner or other are coded out of the labour force.
Visa categories	There are 5 visa categories: Preferential Family, Concessional Family, Business skills, Independent, and Humanitarian.
Country of birth	A persons country of birth.
Educational Qualifications	This refers to qualifications obtained prior to immigrating to Australia. It does not include qualifications since arriving in Australia.
English Speaking / Non English Speaking	This includes people who speak English and people for who English is a second language. For those people whom English is not their first language there are 4 self rated groups, speaks English very well, well, not well or not at all.
Number of children	This collected only for Principal Applicants and is therefore has to be matched to Principal Applicants spouses
Marital status	The marital status of all persons at the time of survey
Self assessed health status	Health status is self assessed as excellent, very good, good, fair, or poor.
Household income	Principal Applicants are asked to match to a list of categories what their before tax total household income from all sources. This information is only collected from Principal Applicants.
Hours worked	Employed persons are disaggregated according to usual hours worked in their main job.
Attitude to current job	Persons are asked how they feel about their current job
Duration of unemployment	Currently unemployed people are disaggregated according to the duration of their unemployment

Table 2

Mean General Health Questionnaire Scores

	Wave 1			Wave 2			Wave 3		
	No	Mean	SD	No	Mea	SD	No	Mean	SD
All	6889	1.35	2.26	5956	1.03	1.98	5017	1.05	2.06
Male	3274	1.22	2.09	2828	0.97	1.95	2400	0.94	1.92
Female	3615	1.47	2.39	3128	1.09	2.00	2617	1.16	2.17
AGE 15-24	803	1.13	1.98	700	0.94	1.79	567	1.12	1.96
AGE 25-34	3160	1.41	2.26	2721	1.00	1.87	2228	1.03	1.98
AGE 35-44	1781	1.45	2.39	1572	1.11	2.10	1362	1.01	2.08
AGE 45-54	630	1.32	2.45	525	1.18	2.24	471	1.20	2.36
AGE 55-64	306	1.11	2.16	259	0.90	2.02	235	0.95	1.99
AGE 65+	209	0.74	1.32	179	0.97	2.26	154	1.05	2.39
Employed	2235	1.05	1.88	2743	0.84	1.76	2787	0.77	1.64
Unemployed	1447	1.78	2.57	771	1.45	2.29	453	1.77	2.78
Out of L.F.	3207	1.36	2.32	2442	1.12	2.08	1777	1.31	2.34
Unemployed < 2mths	249	1.49	2.46	66	1.53	2.36	47	2.02	2.86
Unemployed 2-6 mths	1101	1.84	2.59	123	1.50	2.08	60	2.15	2.96
Unemployed > 6 mths	50	2.06	2.64	563	1.42	2.34	324	1.65	2.76
Unemployed unknown	47	1.57	2.59	19	1.53	2.04	22	1.95	2.38
Hours < 15	123	1.37	2.27	89	0.99	2.02	94	0.79	1.89
Hours 15-24	173	1.55	2.52	167	0.80	1.61	197	0.85	1.77
Hours 25-34	162	1.09	1.87	201	1.00	1.97	185	0.86	1.81
Hours 35+	1758	0.98	1.77	2152	0.80	1.71	2162	0.73	1.57
Hours unknown	19	0.79	1.40	134	1.08	2.07	149	1.07	2.09
Visa Pref Family	2269	1.30	2.20	1924	1.02	1.98	1614	1.15	2.12
Visa Con Family	1251	1.38	2.28	1095	0.98	1.86	986	0.85	1.85
Visa Bus Skills	897	0.97	1.90	764	0.93	1.88	659	0.76	1.70
Visa Independent	1277	1.41	2.22	1112	1.02	1.95	879	0.92	1.87
Visa Humanitarian	1195	1.62	2.57	1061	1.21	2.18	879	1.43	2.50

Table 3

Caseness Proportions General Health Questionnaire Scores

	Wave 1		Wave 2		Wave 3	
	Proportion	SEs	Proportion	SEs	Proportion	SEs
All	0.273	0.005	0.215	0.005	0.214	0.006
Male	0.253	0.008	0.193	0.007	0.190	0.008
Female	0.292	0.008	0.235	0.008	0.237	0.008
AGE 15-24	0.249	0.015	0.211	0.015	0.235	0.018
AGE 25-34	0.287	0.008	0.211	0.008	0.218	0.009
AGE 35-44	0.290	0.011	0.228	0.011	0.202	0.011
AGE 45-54	0.251	0.017	0.244	0.019	0.223	0.019
AGE 55-64	0.222	0.024	0.170	0.023	0.213	0.027
AGE 65+	0.158	0.025	0.173	0.028	0.175	0.031
Employed	0.224	0.009	0.177	0.007	0.165	0.007
Unemployed	0.356	0.013	0.310	0.017	0.333	0.022
Out of L.F.	0.270	0.008	0.229	0.008	0.261	0.010
Unemployed < 2 mths	0.277	0.028	0.364	0.059	0.383	0.071
Unemployed 2-6 mths	0.374	0.015	0.341	0.043	0.417	0.064
Unemployed > 6 mths	0.400	0.069	0.295	0.019	0.306	0.026
Unemployed unknown	0.298	0.067	0.368	0.111	0.409	0.105
Employed Hours < 15	0.260	0.040	0.202	0.043	0.160	0.038
Employed Hours 15-24	0.289	0.034	0.186	0.030	0.193	0.028
Employed Hours 25-34	0.247	0.034	0.199	0.028	0.195	0.029
Employed Hours 35+	0.213	0.010	0.170	0.008	0.158	0.008
Employed Hours	0.211	0.094	0.231	0.036	0.208	0.033
Visa Pref Family	0.265	0.009	0.207	0.009	0.243	0.011
Visa Con Family	0.273	0.013	0.212	0.012	0.169	0.012
Visa Bus Skills	0.211	0.014	0.202	0.015	0.155	0.014
Visa Independent	0.304	0.013	0.214	0.012	0.193	0.013
Visa Humanitarian	0.302	0.013	0.244	0.013	0.279	0.015

Female GHQ mean and caseness scores were higher than male scores in all waves a result often observed (see Vega and Rumbaut, 1991 and Goldberg, 1988). Immigrants aged 35 to 54 years tended to have higher GHQ scores in waves 1 and 2.[7] However, this age effect was not present in wave 3.

[7] t statistics where calculated for GHQ caseness scores for gender and age both set of differences where significant at the 5 percent level.

Unemployed persons displayed higher levels of psychological disadvantage compared to employed persons for all waves and the relative disadvantage of the unemployed compared to the employed grew over time. In waves 2 and 3 immigrants who had been unemployed for less than 6 months tended to have higher caseness scores indicating poorer mental health relative to immigrants' unemployed for greater than 6 months.[8] This result is consistent with Warr *et al* (1987) observation that unemployed persons adapt to their situation though ultimately their mental health is still worse than employed persons.[9] There were some minor differences in caseness scores for employed persons disaggregated by the number of hours worked with higher scores (poorer mental health) for those working 15 to 34 hours. This may be indicative of some underemployment in these groups (for a discussion of immigrant underemployment issues see Wooden *et al*., 1994). Persons immigrating on humanitarian grounds had higher GHQ scores than all other immigrant groups. The difference between the humanitarian visa category and other visa categories was greatest at 42 months, possibly indicating that this group experiences greater transition difficulties.[10]

In waves 1 and 2, immigrants with higher education tended to have higher GHQ scores compared to less well educated immigrants (see Appendix B Tables B.1 and B.2). However, in wave 3 there was little or no difference in GHQ scores between different education groups. Vega and Rumbaut (1991) note that other authors (Portes *et al*., 1990 and Ying *et al*., 1988) found that more highly educated immigrants adjust more rapidly to their new environment than less well educated immigrants. The results of this analysis suggest that

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[8] However, this difference was not significant for GHQ caseness scores at the 5 percent level.

[9] Immigrants were also asked about how they felt about their job. Immigrants who did not like their job had higher GHQ caseness scores than those who did like their job and interestingly, those who were unemployed. This is an indication that a 'bad' job can be worse than no job at all.

[10] For a discussion of attrition issues and possible impacts on these descriptive statistics see Appendix C.

more highly educated immigrants also have more pronounced adjustment phases compared with less well-educated immigrants. GHQ scores by other socioeconomic characteristics can be found in Appendix B Tables B.1 and B.2.

The GHQ mean and caseness scores from this data set were broadly consistent with those found in other studies. For example, Clark and Oswald (1994) found that 49 percent of unemployed males and 58 percent of females had GHQ caseness scores of 2 or more whilst in this study 33 percent of males and 38.5 percent of females had caseness scores of this order. An Australian study of teenagers by Rickwood *et al*., (1996) also reports broadly similar GHQ caseness scores apart from scores for young females, which were much higher in Rickwood *et al*., (1996).[11]

4. Method and Results

In the following regression analysis I report the results of probit regressions using the GHQ caseness score. The GHQ caseness score was used for two reasons. First, this is a common and well-accepted way to model mental health using the GHQ questionnaire. Second, the results of such analysis are more easily interpreted for example; a marginal effect calculated from a GHQ caseness score represents an increase in the probability of minor or major psychological impairment being present. It is difficult to interpret the effects of independent variables when modelling the GHQ score as a 12 response ordered probit or alternatively scoring the GHQ using a Likert scale and modelling as a continuous variable.

[11] In Rickwood *et al* (1996) 40.8 percent of females aged 16 to 24 had GHQ scores of 2 or more whilst in this study 25.7 percent of females aged 15 to 24 scored 2 or more.

4.1 Probit Regressions on Immigrants

Probit regressions were run separately on each wave (cross-sections) where the dependent variable was the GHQ caseness score. Independent variables were selected after considering possible stresses, individual characteristics and the relevant literature. Independent variables included disaggregated labour force status, age and age squared, sex, family size, household income, martial status, education, visa category and country of birth. Table 4 displays the marginal effects on aggregate and disaggregated labour force status variables from probit regressions on wave 1. The marginal effects of other variables (complete regression results for wave 1) are presented in Appendix B, Table B.3.[12] The marginal effects can be interpreted as an increase in the probability of the GHQ caseness score equalling one (which represents minor or major psychological impairment) given an increase in the independent variable. For example, the marginal effect of unemployment in Table 4 is 0.079 thus, the unemployed compared to those out of the labour force (the omitted category) are 7.9 percentage points more likely have a GHQ caseness score of 1. When discussing the GHQ caseness scores proportions in section 3.1 I noted that out of the labour force in wave 1 had a GHQ caseness proportion of 0.27 and the unemployed of 0.36. Thus, the multivariate analysis (in this case) produces a very similar effect to that found in the bivariate analysis.

While the marginal effect of unemployment was positive and significant indicating that unemployed immigrants were more likely to report lower levels of mental health compared to those out of the labour force, employed immigrants were more likely to report

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[12] The same regression conducted for other waves of the survey produced very similar results. In addition, similar coefficients were also obtained when regressions were run separately for males and females on wave 1. A Likelihood ratio test of the equality of male and female coefficient vectors did not reject the null hypothesis (LR statistic 47.88, critical value at a 5 percent level 57.84).

higher levels of mental health. In regressions where unemployment and employment variables were disaggregated according to the duration of unemployment and hours worked, the marginal effect of full-time employment was negative, significant and relatively large compared to other labour force effects.

The marginal effects of unemployment duration of 2 to 6 months and greater than 6 months were positive and significant indicating these groups tended to report poorer mental health after controlling for other stresses and individual characteristics.

Table 4

Mental Health Regressions: Dependent variable General Health Questionnaire Caseness Score (Probit) – Wave 1 (1=poor mental health)

Variables	Marginal Effect	t statistic	Marginal Effect	t statistic
Employed	-0.060	3.93		
Unemployed	0.079	5.10		
Hours < 15			-0.029	0.74
Hours 15-24			0.003	0.09
Hours 25-34			-0.417	1.16
Hours 35+			-0.079	4.72
Hours unknown			0.024	0.23
Unemployed < 2 mths			-0.002	0.07
Unemployed 2-6 mths			0.096	5.63
Unemployed > 6 mths			0.123	1.85
Unemployed unknown			0.027	0.42
No of Obs	6889		6889	
Log Likelihood	-3906		-3897	

* Omitted categories; Out of the labour force, Married, No Kids, Higher Degree, English Speaking or speaks English very well, Visa Humanitarian, Oceania, Income – none.

Full regression results are presented in Appendix B see Table B.3. The marginal effects of other explanatory variables were signed similarly to those in previous studies. In particular, age was nonlinearly related to mental health, the martial status category separated had a negative and significant effect on mental health, whilst the visa category humanitarian

had a negative and significant effect on mental health compared to other visa categories. Thus, humanitarian migrants had worse mental health than otherwise similar migrants.

4.2 Panel Regressions on Immigrants

A second series of regressions were estimated to take advantage of the longitudinal aspect of the data. The longitudinal data set allows me to control for individual differences in responses to unemployment and immigration. In examining, how individuals respond to changes in their environment there is likely to be common or average response across all individuals. However, due to for example, personality differences or learnt coping mechanisms each individual's response will differ. When data is not available on these individual differences panel models are able to control, in part, for these effects unlike models estimated on cross-section data.

The coefficients on disaggregated labour force status variables are presented for a probit regression on wave 1, a balanced panel random effects probit model and an unbalanced panel random effects probit model, see Table 5.[13] Full regression results and marginal effects for the panel models are presented in Appendix B, see Tables B.4a and B.4b.[14]

A Hausman (1978) test following Nijman and Verbeek (1992) between the balanced and unbalanced panel random effects models was used to test for the effect of attrition. The test indicates that attrition was not affecting these regressions. A likelihood ratio test of

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[13] A series of fixed and random effects panel models were also run where the GHQ variable was treated as continuous. The results from these regressions are discussed where they varied substantially from the panel probit regressions on GHQ caseness scores though they rarely differed.

[14] Marginal effects for panel regressions were calculated at the mean of explanatory variables.

whether panel level variance is an important component of overall variance is significant. Thus, the panel model is preferred to a pooled regression model.[15]

Table 5

Mental Health Regressions: Dependent variable General Health Questionnaire Caseness Score

	Probit Wave1		Random Effects Probit Panel (Balanced)		Random Effects Probit Panel (Unbalanced)	
Variables	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic
Hours < 15	-0.094	0.73	-0.165	1.42	-0.181	1.75
Hours 15-24	0.009	0.09	-0.147	1.68	-0.130	1.66
Hours 25-34	-0.132	1.16	-0.140	1.57	-0.145	1.83
Hours 35+	-0.251	4.72	-0.276	5.96	-0.272	6.63
Hours unknown	0.072	0.22	-0.221	1.91	-0.110	1.07
Unemployed < 2 mths	-0.006	0.07	0.132	1.32	0.138	1.59
Unemployed 2-6 mths	0.279	5.63	0.320	5.26	0.332	6.49
Unemployed > 6 mths	0.344	1.84	0.235	3.63	0.251	4.25
Unemployed unknown	0.082	0.41	0.396	2.13	0.329	1.97
Intercept	-0.812	2.97	-1.219	8.52	-1.108	4.40
				SE		SE
Sigma_u			0.724	0.027	0.733	0.025
Rho			0.343	0.017	0.349	0.015
Hausman test					38.30	(0.90)
No of Obs	6889		14268		17860	
Log Likelihood	-3897		-7136		-9214	

* Omitted categories; Out of the labour force, Married, No Kids, Higher Degree, English Speaking or speaks English very well, Visa Humanitarian, Oceania, Income – none, Wave 1.

In general, the coefficients obtained from panel regression were similar to those obtained from the probit regression on wave 1. For the panel regressions, the coefficient on immigrants employed full time was significant and negative indicating that this group relative to those out of the labour force has lower GHQ caseness scores (or higher levels of mental

[15] This analysis was also undertaken treating the GHQ variable as continuous and estimating fixed and random effects panel models. The results of this analysis did not differ in any substantial way from the results presented in this paper. In particular, there was no substantial difference in the random and fixed effects models thus, use of the random effects models appears appropriate for this analysis.

health). All coefficients on unemployment duration variables were positive and significant except for the coefficient on unemployed for less than 2 months, which was insignificant.

The cross-section and the panel regression results are largely consistent with the picture provided by the descriptive results. In terms of labour force status, immigrants who are unemployed, particularly those who have been unemployed for more than 2 months, appear least mentally healthy. Immigrants who are unemployed for greater than 6 months have poorer mental health than employed persons but better than those who have been unemployed for 2 to 6 months. Similarly to the descriptive results, the regression results indicate that other characteristics associated with poor mental health include marital status - separated, the humanitarian visa category, low household income, and poor English language skills. It is also clear that the general immigrant population goes through some adjustment process after arrival in Australia with psychological disadvantage higher at 6 months after immigration than after 18 months and after 42 months.

4.3 Testing for Causality

Studies that use cross-section data are unable to determine whether changes in mental health are causing changes in labour force status rather than changes in labour force status (unemployment) causing changes in mental health. Banks *et al* (1982) and Jackson *et al* (1983) (as cited in Warr *et al*, 1988) have found evidence that causality runs from unemployment to mental health. Banks *et al* (1982) examined causality in the context of school leavers where GHQ scores were taken before leaving school and at a latter time when persons were in the labour force. They found that early GHQ scores (during schooling) did not predict labour force status.

The issues of causality between mental health and unemployment are complicated by a number of other factors. Studies have found that job insecurity or impending plant closures

also have large mental health effects, see for example Kasl *et al*., (1975). These results suggest that it would be easy to ascribe to poor mental health a causal relationship with labour force status when in fact job insecurity is the underlying mechanism of change.

In this study, I tested the notion that underlying mental health might be predicting labour force status. Multinomial logit models were estimated with wave 2 labour force status as the dependent variables and GHQ scores in wave 1 as an independent variable.[16] Other independent variables were age, education, gender, English language ability and visa category. Three multinomial logit models were estimated with each model conditioned on immigrant labour force status in wave 1. Models were conditioned on labour force status in wave 1 so the effect of mental health on a change in labour force status could be estimated. Most coefficients on wave 1 GHQ scores were insignificant, indicating that the mental health status of immigrants did not predict labour force status (in particular the transition from employment to unemployment) in wave 2, see Table 6.[17] Full regression results are presented in Appendix B, see Tables B.5a, B.5b and B.5c.

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[16] The period between waves 1 and 2 was 1 year.

[17] In the regression results presented GHQ scores in wave 1 were treated as a set of dummy variables. Results from regressions where the GHQ score is treated as a continuous variable were similar with the coefficient on the GHQ score always being insignificant. Regressions were also run where wave 2 GHQ scores were used to predict wave 3 labour force status, the results from these regressions were consistent with regressions results obtained using wave 1 and wave 2 data.

Table 6

Labour Force Status Regressions: Dependent variable Labour Force Status in Wave 2 - Base Case Employment Wave 2 (Multinomial Logit Regressions).

	Outcome – Unemployment		Outcome – Out of LF	
Variables	Coefficients	t statistic	Coefficients	t statistic
Wave 1 Condition - Employed				
GHQ = 0	0.01	0.02	-0.55	-2.40
GHQ = 1	0.31	0.70	-0.35	-1.24
GHQ = 2	-0.58	-0.84	-0.65	-1.80
Wave 1 Condition - Unemployed				
GHQ = 0	0.26	1.51	-0.05	-0.29
GHQ = 1	0.33	1.58	-0.01	-0.05
GHQ = 2	0.26	1.01	0.03	0.12
Wave 1 Condition – Out of L.F.				
GHQ = 0	0.25	1.32	0.12	0.96
GHQ = 1	0.30	1.30	0.10	0.66
GHQ = 2	0.62	2.23	0.26	1.38

* Omitted categories: GHQ = 3 or more, Higher Degree, English Speaking or speaks English very well, Visa Humanitarian.

The results of this analysis are consistent with Bank *et al* (1982) and Jackson *et al* (1983) as cited in Warr *et al* (1987) in that mental health in an earlier period is found not to be predictor of unemployment in a later period. In this study, the time period between when mental health is measured and the labour market probability observed is one year. Thus, the analysis presented in this paper is only likely to indicate whether fairly long standing mental health issues predict employment or unemployment conditional on labour market status in the earlier period. I am unable to examine short-term effects, for example, whether a decline in mental health has a short-term (less than one year) impact on labour market outcomes.

5. Conclusions

That unemployment has adverse mental health consequences for immigrants is important for current Australian immigration policy. Policies that restrict immigrant access to labour market programs (assuming that these labour market programs reduce the probability unemployment) may have counter productive health consequences. The health consequences of such policies may not only lead to sub-optimal outcomes for immigrants they may well have health care cost implications.

The results of this study are largely consistent with the unemployment and mental health and the immigrant and mental health literatures. Unemployment has a significant negative effect on the mental health of immigrants. Other variables associated with immigrant mental health include age, marital status, education level, household income, and visa category. Australian immigrants also display a pattern of adjustment to their new country similar to immigrants to other countries. In this study, immigrant psychological disadvantage was higher 6 months after migration than it was at 18 months and 42 months after migration. An examination of the issue of causality between immigrant mental health and labour force status found that causality ran from labour force status to mental health, and not visa versa.

Unemployed immigrants also seem to display a pattern of adjustment to unemployment similar to that found in other studies of unemployment and mental health. That is, mental health was poorest for those who had been unemployed for 2 to 6 months and slightly better for those unemployed for more than 6 months. However, immigrants who were unemployed for longer than 6 months still reported poorer mental health than did employed immigrants.

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Appendix A – The 12 Question General Health Questionnaire

Have you recently been able to concentrate on whatever you're doing? Better Same Less Much less	Have you recently been able to enjoy your normal day-to-day activities? More so Same Less Much less
Have you recently lost much sleep over worry? Not at all No more than usual Rather more Much more	Have you recently been able to face up to your problems? More so Same Less Much less
Have you recently felt that you are playing a useful part in things? More so Same Less Much less	Have you recently been feeling unhappy and depressed? Not at all No more than usual Rather more Much more
Have you recently felt capable of making decisions about things? More so Same Less Much less	Have you recently been losing confidence in yourself? Not at all No more than usual Rather more Much more
Have you recently felt constantly under strain? Not at all No more than usual Rather more Much more	Have you recently been thinking of yourself as a worthless person? Not at all No more than usual Rather more Much more
Have you recently felt that you couldn't overcome your difficulties? Not at all No more than usual Rather more Much more	Have you recently been feeling reasonably happy all things considered? More so Same Less Much less

Appendix B

Table B.1a: Mean General Health Questionnaire Scores – Binary Scoring

	Wave 1			Wave 2			Wave 3		
	No	Mean	SD	No	Mean	SD	No	Mean	SD
Higher Degree	659	1.44	2.32	583	1.06	2.00	473	0.90	1.87
Post Graduate Diploma	409	1.69	2.47	347	1.24	2.30	289	1.02	1.83
Bachelor Degree	1523	1.57	2.35	1304	1.15	2.08	1097	1.03	1.98
Technical / Diploma	1448	1.34	2.28	1272	1.02	1.93	1078	1.09	2.12
Trade	424	1.40	2.59	376	0.95	1.98	326	1.07	2.23
12 + Years of Schooling	1153	1.17	2.03	986	0.93	1.87	841	0.98	1.90
10-11 Years Schooling	508	1.00	2.00	422	0.84	1.67	363	1.05	2.11
7-9 Years of Schooling	394	1.10	2.11	347	1.10	2.12	281	1.20	2.39
6 - Years of Schooling	323	1.10	2.00	275	0.94	1.81	237	1.19	2.26
Other	48	1.42	2.27	44	0.98	2.10	30	2.30	3.43
Married	5295	1.33	2.23	4680	0.99	1.90	4043	0.97	1.95
Separated	79	2.30	3.40	121	2.08	3.20	156	1.95	2.75
Divorced	129	1.50	2.76	115	1.30	2.22	149	1.74	2.81
Widowed	165	1.38	2.39	145	1.30	2.46	132	1.55	2.85
Never married	1220	1.35	2.21	891	1.05	2.00	536	1.06	2.01
No KIDS	5054	1.34	2.26	4045	1.02	2.00	3124	1.05	2.10
KIDS 1	876	1.50	2.38	949	1.07	1.97	871	1.08	2.02
KIDS 2	668	1.33	2.22	681	1.09	1.96	746	1.03	1.94
KIDS 3	200	1.06	1.83	198	0.88	1.66	193	0.84	1.61
KIDS 4+	91	1.11	1.91	83	1.17	1.97	83	1.34	2.80
Health Very good	3578	0.98	1.82	2603	0.69	1.52	1990	0.63	1.48
Health Good	2717	1.51	2.35	2641	1.04	1.94	2284	0.96	1.90
Health Fair	480	2.47	3.15	563	1.90	2.65	575	1.83	2.54
Health Poor	96	4.21	3.66	126	3.35	3.38	143	4.36	3.62
Health Very Poor	14	4.50	4.33	22	4.73	4.23	24	5.33	4.08
English Speaking	1752	1.31	2.24	1589	1.01	1.95	1357	0.87	1.82
Speaks English v well	796	1.42	2.26	735	0.99	1.97	753	0.87	1.75
Speaks English well	1552	1.34	2.21	1788	1.04	2.01	1659	1.05	2.01
Speaks English not well	1998	1.30	2.21	1563	1.03	1.91	1076	1.32	2.42
Speaks English notat all	791	1.48	2.51	281	1.25	2.32	172	1.58	2.79
Income None	138	1.42	2.48	29	1.34	1.86	16	2.75	3.24
Income 1 to 8000	243	1.43	2.42	140	1.31	2.52	92	1.29	2.29
Income 8001 to 16000	682	1.51	2.53	425	1.38	2.37	316	1.73	2.80
Income 16001 to 25000	1225	1.59	2.48	1014	1.12	2.00	628	1.43	2.52
Income 25001 to 35000	799	1.35	2.27	852	1.02	2.00	719	1.14	2.09
Income 35001 to 50000	826	1.23	2.09	953	0.98	1.91	838	0.81	1.68
Income >50000	1318	1.19	2.04	1513	0.84	1.69	1780	0.84	1.77
Income NA	1658	1.27	2.15	1030	1.11	2.12	628	1.05	2.08
Job Love it	316	0.51	1.18	366	0.46	1.26	472	0.54	1.19
Job Like it	932	0.83	1.59	1152	0.67	1.42	1235	0.65	1.39
Job okay	837	1.18	1.91	1150	1.00	1.96	1116	0.92	1.88
Job Don't care	118	1.91	2.58	208	1.18	2.22	131	1.47	2.59
Job Dislike	74	3.09	3.20	62	1.68	2.41	35	3.03	3.48
Job Dislike a lot	14	2.29	3.36	16	1.69	2.47	13	2.92	3.30
Job Hate it	17	3.82	3.30	31	4.00	3.49	17	2.94	3.29
Oceania	140	0.90	1.91	120	0.58	1.56	112	0.61	1.25
Europe & USSR	2262	1.49	2.43	1981	1.10	2.10	1654	1.04	2.03
Middle East North Africa	791	1.27	2.05	689	1.12	2.08	574	1.64	2.63
Southeast Asia	1110	1.08	1.94	931	0.77	1.63	824	0.78	1.62
Northeast Asia	898	1.40	2.30	764	1.03	1.97	585	0.88	1.81
Southern Asia	630	1.28	2.13	558	1.00	1.87	497	0.98	2.02
Northern America	175	1.38	2.10	140	1.16	1.94	117	0.80	1.79
South America	388	1.43	2.39	339	1.20	2.14	276	1.30	2.28
Africa	495	1.48	2.47	434	1.13	2.02	378	1.18	2.35

Table B.1b: Mean General Health Questionnaire Scores – Likert Scoring

	Wave 1			Wave 2			Wave 3		
	No	Mean	SD	No	Mean	SD	No	Mean	SD
All	6889	8.81	4.96	5956	8.71	4.48	5017	8.91	4.53
Male	3274	8.42	4.74	2828	8.44	4.45	2400	8.61	4.33
Female	3615	9.16	5.13	3128	8.96	4.50	2617	9.19	4.69
AGE 15-24	803	7.95	4.56	700	7.90	4.27	567	8.32	4.57
AGE 25-34	3160	9.00	4.89	2721	8.59	4.31	2228	8.77	4.42
AGE 35-44	1781	9.08	5.15	1572	9.06	4.66	1362	9.05	4.46
AGE 45-54	630	8.66	5.46	525	9.06	4.88	471	9.47	4.91
AGE 55-64	306	8.40	4.80	259	9.19	4.44	235	9.44	4.52
AGE 65+	209	7.99	3.93	179	8.94	4.67	154	9.40	5.11
Employed	2235	8.20	4.30	2743	8.17	4.15	2787	8.28	3.91
Unemployed	1447	9.66	5.43	771	9.58	4.90	453	10.26	5.60
Out of L.F.	3207	8.85	5.11	2442	9.05	4.63	1777	9.57	4.94
Unemployed < 2mths	249	9.28	5.33	66	9.65	5.15	47	10.62	5.38
Unemployed 2-6 mths	1101	9.77	5.41	123	9.73	4.51	60	10.85	5.89
Unemployed > 6 mths	50	9.80	5.96	563	9.53	4.96	324	10.13	5.63
Unemployed unknown	47	8.83	5.97	19	10.00	4.86	22	9.82	4.91
Hours < 15	123	8.76	5.01	89	8.63	5.17	94	9.07	4.17
Hours 15-24	173	9.27	5.00	167	8.25	4.01	197	8.18	4.06
Hours 25-34	162	8.40	4.36	201	8.50	4.39	185	8.53	4.09
Hours 35+	1758	8.03	4.16	2152	8.09	4.04	2162	8.20	3.80
Hours unknown	19	8.21	3.58	134	8.56	4.84	149	8.72	4.85
Visa Pref Family	2269	8.49	4.92	1924	8.32	4.47	1614	8.84	4.70
Visa Con Family	1251	8.93	4.96	1095	8.72	4.22	986	8.58	4.19
Visa Bus Skills	897	8.20	4.38	764	8.89	4.28	659	8.76	3.80
Visa Independent	1277	9.27	4.66	1112	8.81	4.27	879	8.79	4.16
Visa Humanitarian	1195	9.25	5.63	1061	9.18	5.04	879	9.65	5.30
Higher Degree	659	9.30	4.90	583	9.28	4.11	473	9.36	3.95
Post Graduate Diploma	409	9.78	5.22	347	9.15	4.79	289	8.84	4.27
Bachelor Degree	1523	9.50	4.95	1304	9.10	4.55	1097	8.92	4.35
Technical / Diploma	1448	8.68	5.02	1272	8.65	4.44	1078	8.89	4.55
Trade	424	8.75	5.59	376	8.47	4.51	326	9.06	4.79
12 + Years of Schooling	1153	8.30	4.71	986	8.33	4.59	841	8.68	4.41
10-11 Years Schooling	508	7.83	4.62	422	8.12	4.05	363	8.56	4.90
7-9 Years of Schooling	394	8.15	4.83	347	8.30	4.83	281	8.87	5.20
6 - Years of Schooling	323	8.14	4.39	275	8.53	4.28	237	9.08	4.81
Other	48	8.71	5.64	44	8.61	4.08	30	11.23	6.91
Married	5295	8.79	4.92	4680	8.66	4.37	4043	8.80	4.37
Separated	79	10.30	6.99	121	10.50	6.38	156	10.38	5.72
Divorced	129	8.77	5.69	115	8.94	4.72	149	9.99	5.51
Widowed	165	9.11	5.46	145	9.48	5.08	132	10.26	5.84
Never married	1220	8.74	4.81	891	8.57	4.58	536	8.69	4.53
Health Very good	3578	7.80	4.40	2603	7.60	3.97	1990	7.65	3.80
Health Good	2717	9.45	4.91	2641	9.06	4.22	2284	9.02	4.16
Health Fair	480	11.44	5.92	563	10.92	5.12	575	10.86	4.79
Health Poor	96	13.99	7.60	126	12.96	6.39	143	15.36	6.93
Health Very Poor	14	14.64	10.26	22	16.59	9.47	24	17.33	8.41
English Speaking	1752	8.68	4.87	1589	8.64	4.31	1357	8.55	3.98
Speaks English v well	796	9.05	4.91	735	8.51	4.50	753	8.28	4.16
Speaks English well	1552	8.88	4.87	1788	8.69	4.51	1659	8.96	4.56
Speaks English not well	1998	8.69	4.94	1563	8.77	4.53	1076	9.57	4.99
Speaks English notat all	791	9.00	5.41	281	9.44	4.88	172	10.00	5.97
Income None	138	8.46	5.64	29	9.66	3.81	16	11.38	5.78
Income 1 to 8000	243	8.62	5.21	140	9.93	5.37	92	9.68	4.73
Income 8001 to 16000	682	9.28	5.52	425	9.50	5.28	316	10.35	5.59
Income 16001 to 25000	1225	9.34	5.14	1014	8.93	4.53	628	9.74	5.37
Income 25001 to 35000	799	8.89	5.07	852	8.57	4.52	719	8.86	4.69
Income 35001 to 50000	826	8.66	4.75	953	8.67	4.43	838	8.54	4.05
Income >50000	1318	8.58	4.50	1513	8.27	3.80	1780	8.55	4.00
Job Love it	316	6.25	3.54	366	6.64	3.70	472	6.93	3.45
Job Like it	932	7.81	3.91	1152	7.68	3.56	1235	7.99	3.38
Job okay	837	8.74	4.32	1150	8.78	4.25	1116	8.87	4.18
Job Don't care	118	10.08	5.31	208	9.50	4.72	131	10.45	5.29
Job Dislike	74	12.09	5.84	62	10.92	5.30	35	12.74	6.33
Job Dislike a lot	14	10.71	6.71	16	10.13	5.32	13	12.38	5.58
Job Hate it	17	13.71	6.35	31	14.65	7.37	17	12.71	6.61
Oceania	140	7.05	4.82	120	6.64	4.28	112	6.81	3.79
Europe & USSR	2262	9.42	5.14	1981	9.26	4.53	1654	9.14	4.31
Middle East North Africa	791	8.12	4.71	689	8.24	4.78	574	9.55	5.58
Southeast Asia	1110	7.94	4.46	931	7.67	4.02	824	7.97	4.14
Northeast Asia	898	9.59	4.76	764	9.45	4.21	585	9.44	3.91
Southern Asia	630	8.46	4.72	558	8.47	4.25	497	8.80	4.50
Northern America	175	9.03	4.36	140	9.41	4.06	117	8.78	4.14
South America	388	8.54	5.25	339	8.51	4.83	276	8.80	4.88
Africa	495	8.70	5.56	434	8.69	4.70	378	9.07	5.04

Table B.2: Caseness Proportions General Health Questionnaire Scores

	Wave 1		**Wave 2**		**Wave 3**	
	Proportion	SEs	Proportion	Mean	Proportion	Mean
Higher Degree	0.303	0.018	0.226	0.017	0.188	0.018
Post Graduate Diploma	0.350	0.024	0.245	0.023	0.215	0.024
Bachelor Degree	0.321	0.012	0.236	0.012	0.210	0.012
Technical / Diploma	0.263	0.012	0.222	0.012	0.225	0.013
Trade	0.248	0.021	0.191	0.020	0.215	0.023
12 + Years of Schooling	0.252	0.013	0.198	0.013	0.209	0.014
10-11 Years Schooling	0.193	0.018	0.164	0.018	0.209	0.021
7-9 Years of Schooling	0.234	0.021	0.219	0.022	0.224	0.025
6 - Years of Schooling	0.220	0.023	0.196	0.024	0.232	0.027
Other	0.250	0.063	0.205	0.061	0.400	0.089
Married	0.272	0.006	0.207	0.006	0.203	0.006
Separated	0.342	0.053	0.364	0.044	0.365	0.039
Divorced	0.248	0.038	0.270	0.041	0.315	0.038
Widowed	0.291	0.035	0.241	0.036	0.280	0.039
Never married	0.274	0.013	0.226	0.014	0.215	0.018
No KIDS	0.269	0.006	0.210	0.006	0.207	0.007
KIDS 1	0.306	0.016	0.216	0.013	0.224	0.014
KIDS 2	0.277	0.017	0.244	0.016	0.233	0.015
KIDS 3	0.215	0.029	0.207	0.029	0.207	0.029
KIDS 4+	0.264	0.046	0.241	0.047	0.229	0.046
Health Very good	0.212	0.007	0.146	0.007	0.140	0.008
Health Good	0.312	0.009	0.226	0.008	0.200	0.008
Health Fair	0.427	0.023	0.380	0.020	0.381	0.020
Health Poor	0.646	0.049	0.595	0.044	0.713	0.038
Health Very Poor	0.571	0.132	0.636	0.103	0.792	0.083
English Speaking	0.265	0.011	0.213	0.010	0.178	0.010
Speaks English v well	0.302	0.016	0.205	0.015	0.185	0.014
Speaks English well	0.277	0.011	0.213	0.010	0.225	0.010
Speaks English not well	0.261	0.010	0.216	0.010	0.256	0.013
Speaks English notat all	0.286	0.016	0.260	0.026	0.267	0.034
Income None	0.304	0.039	0.379	0.090	0.500	0.125
Income 1 to 8000	0.276	0.029	0.236	0.036	0.272	0.046
Income 8001 to 16000	0.271	0.017	0.278	0.022	0.313	0.026
Income 16001 to 25000	0.314	0.013	0.232	0.013	0.285	0.018
Income 25001 to 35000	0.270	0.016	0.211	0.014	0.245	0.016
Income 35001 to 50000	0.268	0.015	0.198	0.013	0.177	0.013
Income >50000	0.253	0.012	0.186	0.010	0.172	0.009
Income NA	0.261	0.011	0.227	0.013	0.215	0.016
Job Love it	0.104	0.017	0.101	0.016	0.127	0.015
Job Like it	0.186	0.013	0.150	0.011	0.143	0.010
Job okay	0.260	0.015	0.210	0.012	0.192	0.012
Job Don't care	0.390	0.045	0.236	0.029	0.290	0.040
Job Dislike	0.581	0.057	0.339	0.060	0.543	0.084
Job Dislike a lot	0.429	0.132	0.375	0.121	0.462	0.138
Job Hate it	0.765	0.103	0.742	0.079	0.529	0.121
Oceania	0.186	0.033	0.117	0.029	0.125	0.031
Europe & USSR	0.291	0.010	0.226	0.009	0.212	0.010
Middle East North Africa	0.279	0.016	0.231	0.016	0.324	0.020
Southeast Asia	0.229	0.013	0.166	0.012	0.176	0.013
Northeast Asia	0.292	0.015	0.216	0.015	0.178	0.016
Southern Asia	0.252	0.017	0.220	0.018	0.201	0.018
Northern America	0.286	0.034	0.243	0.036	0.137	0.032
South America	0.278	0.023	0.230	0.023	0.264	0.027
Africa	0.291	0.020	0.247	0.021	0.230	0.022

Table B.3: Mental Health Regressions: Dependent variable General Health Questionnaire Caseness Score (Probit)

Variables	Marginal Effect	t statistic	Marginal Effect	t statistic
Employed	-0.061	-3.93		
Unemployed	0.079	5.10		
Hours < 15			-0.030	-0.74
Hours 15-24			0.003	0.09
Hours 25-34			-0.042	-1.16
Hours 35+			-0.079	-4.72
Hours unknown			0.024	0.23
Unemployed < 2 mths			-0.002	-0.07
Unemployed 2-6 mths			0.097	5.63
Unemployed > 6 mths			0.123	1.85
Unemployed unknown			0.028	0.42
Age	0.008	2.57	0.008	2.51
Age Squared	0.000	-3.36	0.000	-3.35
Separated	0.075	1.43	0.076	1.45
Divorced	-0.026	-0.64	-0.025	-0.61
Widowed	0.084	2.03	0.086	2.07
Never married	0.001	0.03	0.000	-0.02
KIDS 1	0.003	0.21	0.002	0.1
KIDS 2	0.007	0.41	0.006	0.33
KIDS 3	-0.031	-1.16	-0.034	-1.27
KIDS 4+	-0.013	-0.33	-0.015	-0.38
Post Graduate Diploma	0.025	0.92	0.026	0.95
Bachelor Degree	-0.004	-0.20	-0.006	-0.27
Technical / Diploma	-0.062	-3.03	-0.061	-3
Trade	-0.065	-2.43	-0.064	-2.38
12 + Years of Schooling	-0.081	-3.76	-0.082	-3.83
10-11 Years Schooling	-0.121	-4.86	-0.123	-4.94
7-9 Years of Schooling	-0.097	-3.51	-0.098	-3.55
6 - Years of Schooling	-0.113	-3.76	-0.113	-3.75
Speaks English well	-0.037	-2.34	-0.039	-2.45
Speaks English not well	-0.036	-2.12	-0.038	-2.28
Speaks English notat all	0.020	0.83	0.019	0.8
Visa Pref Family	-0.022	-1.20	-0.019	-1.02
Visa Con Family	-0.047	-2.36	-0.042	-2.12
Visa Bus Skills	-0.098	-4.33	-0.094	-4.15
Visa Independent	-0.035	-1.70	-0.031	-1.46
Female |	0.042	3.50	0.038	3.13
Europe & USSR	0.117	2.64	0.117	2.64
Middle East North Africa	0.082	1.74	0.081	1.7
Southeast Asia	0.042	0.92	0.041	0.91
Northeast Asia	0.143	2.92	0.143	2.91
Southern Asia	0.034	0.73	0.032	0.69
Northern America	0.124	2.10	0.127	2.15
South America	0.095	1.86	0.092	1.79
Africa	0.127	2.55	0.127	2.53
Income 1 to 8000	-0.058	-1.29	-0.058	-1.3
Income 8001 to 16000	-0.069	-1.73	-0.070	-1.76
Income 16001 to 25000	-0.028	-0.69	-0.029	-0.71
Income 25001 to 35000	-0.050	-1.24	-0.049	-1.21
Income 35001 to 50000	-0.040	-0.98	-0.037	-0.91
Income >50000	-0.045	-1.15	-0.040	-1.01
Income NA	-0.049	-1.26	-0.048	-1.22

* Omitted categories; Out of the labour force, Married, No Kids, Higher Degree, English Speaking or speaks English very well, Visa Humanitarian, Oceania, Income – none.

Table B.4a: Mental Health Regressions, Dependent variable General Health Questionnaire Caseness Score

	Probit Wave1		Random Effects Probit Panel (Balanced)		Random Effects Probit Panel (Unbalanced)	
Variables	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic
Hours < 15	-0.094	-0.74	-0.166	-1.43	-0.181	-1.76
Hours 15-24	0.010	0.09	-0.147	-1.68	-0.130	-1.66
Hours 25-34	-0.133	-1.16	-0.141	-1.58	-0.145	-1.83
Hours 35+	-0.252	-4.73	-0.276	-5.96	-0.273	-6.64
Hours unknown	0.073	0.23	-0.221	-1.91	-0.111	-1.07
Unemployed < 2 mths	-0.006	-0.07	0.133	1.32	0.139	1.59
Unemployed 2-6 mths	0.280	5.63	0.320	5.27	0.333	6.50
Unemployed > 6 mths	0.344	1.85	0.236	3.63	0.252	4.26
Unemployed unknown	0.083	0.42	0.396	2.13	0.330	1.98
Age	0.024	2.52	0.028	2.93	0.026	3.20
Age Squared	0.000	-3.35	0.000	-3.64	0.000	-3.99
Separated	0.220	1.45	0.536	5.44	0.509	5.74
Divorced	-0.077	-0.61	0.238	2.32	0.197	2.13
Widowed	0.246	2.07	0.248	2.09	0.287	2.82
Never married	-0.001	-0.02	0.109	1.94	0.091	1.90
Wave 2			-0.127	-3.64	-0.156	-5.21
Wave 3			-0.073	-2.01	-0.108	-3.30
KIDS 1	0.005	0.10	0.029	0.65	0.016	0.41
KIDS 2	0.018	0.33	0.079	1.63	0.070	1.63
KIDS 3	-0.107	-1.27	-0.048	-0.65	-0.042	-0.62
KIDS 4+	-0.045	-0.38	-0.027	-0.25	-0.033	-0.33
Post Graduate Diploma	0.078	0.95	0.053	0.59	0.036	0.47
Bachelor Degree	-0.017	-0.27	-0.042	-0.64	-0.033	-0.57
Technical / Diploma	-0.193	-3.00	-0.137	-2.02	-0.157	-2.67
Trade	-0.207	-2.38	-0.151	-1.69	-0.161	-2.05
12 + Years of Schooling	-0.266	-3.83	-0.281	-3.83	-0.295	-4.65
10-11 Years Schooling	-0.427	-4.94	-0.342	-3.79	-0.393	-5.04
7-9 Years of Schooling	-0.332	-3.55	-0.279	-2.85	-0.282	-3.38
6 - Years of Schooling	-0.393	-3.75	-0.298	-2.77	-0.345	-3.72
Speaks English well	-0.120	-2.46	-0.039	-0.90	-0.037	-0.97
Speaks English not well	-0.119	-2.28	-0.020	-0.39	-0.030	-0.67
Speaks English notat all	0.057	0.80	0.111	1.39	0.097	1.42
Visa Pref Family	-0.057	-1.02	0.146	3.73	0.163	4.80
Visa Con Family	-0.132	-2.12	-0.042	-0.75	-0.049	-0.99
Visa Bus Skills	-0.312	-4.15	-0.167	-2.68	-0.183	-3.31
Visa Independent	-0.095	-1.46	-0.194	-2.61	-0.273	-4.19
Female |	0.117	3.14	-0.082	-1.23	-0.126	-2.16
Europe & USSR	0.346	2.64	0.465	3.50	0.462	3.82
Middle East North Africa	0.233	1.70	0.494	3.54	0.450	3.56
Southeast Asia	0.123	0.92	0.182	1.33	0.195	1.57
Northeast Asia	0.403	2.91	0.466	3.29	0.437	3.42
Southern Asia	0.096	0.69	0.315	2.24	0.292	2.29
Northern America	0.355	2.15	0.494	2.83	0.469	3.05
South America	0.263	1.79	0.490	3.30	0.438	3.26
Africa	0.356	2.53	0.525	3.66	0.504	3.88
Income 1 to 8000	-0.189	-1.30	-0.315	-1.79	-0.262	-1.84
Income 8001 to 16000	-0.226	-1.76	-0.269	-1.68	-0.269	-2.09
Income 16001 to 25000	-0.089	-0.71	-0.266	-1.69	-0.258	-2.05
Income 25001 to 35000	-0.154	-1.21	-0.293	-1.85	-0.280	-2.21
Income 35001 to 50000	-0.116	-0.91	-0.378	-2.39	-0.327	-2.58
Income >50000	-0.126	-1.01	-0.387	-2.46	-0.365	-2.90
Income NA	-0.149	-1.22	-0.323	-2.05	-0.293	-2.35
Intercept	-0.812	-2.98	-1.219	-4.16	-1.108	-4.41
Sigma_u			0.724	0.027	0.733	0.025
Rho			0.343	0.017	0.349	0.015
Hausman test					38.30	(0.90)
No of Obs	6889		14268		17860	
Log likelihood	-3897		-7136		-9214	

* Omitted categories; Out of the labour force, Married, No Kids, Higher Degree, English Speaking or speaks English very well, Visa Humanitarian, Oceania, Income – none, Wave 1.

Table B.4b: Mental Health Regressions, Dependent variable General Health Questionnaire Caseness Score

	Random Effects Probit Panel (Balanced)		Random Effects Probit Panel (Unbalanced)	
Variables	Marginal Effect	t statistic	Marginal Effect	t statistic
Hours < 15	-0.041	-1.43	-0.046	-1.76
Hours 15-24	-0.037	-1.68	-0.033	-1.66
Hours 25-34	-0.035	-1.58	-0.037	-1.83
Hours 35+	-0.069	-5.96	-0.069	-6.64
Hours unknown	-0.055	-1.91	-0.028	-1.07
Unemployed < 2 mths	0.033	1.32	0.035	1.59
Unemployed 2-6 mths	0.080	5.27	0.085	6.50
Unemployed > 6 mths	0.059	3.63	0.064	4.26
Unemployed unknown	0.099	2.13	0.084	1.98
Age	0.007	2.93	0.007	3.20
Age Squared	0.000	-3.64	0.000	-3.99
Separated	0.134	5.44	0.130	5.74
Divorced	0.060	2.32	0.050	2.13
Widowed	0.062	2.09	0.073	2.82
Never married	0.027	1.94	0.023	1.90
Wave 2	-0.032	-3.64	-0.040	-5.21
Wave 3	-0.018	-2.01	-0.027	-3.30
KIDS 1	0.007	0.65	0.004	0.41
KIDS 2	0.020	1.63	0.018	1.63
KIDS 3	-0.012	-0.65	-0.011	-0.62
KIDS 4+	-0.007	-0.25	-0.008	-0.33
Post Graduate Diploma	0.013	0.59	0.009	0.47
Bachelor Degree	-0.011	-0.64	-0.008	-0.57
Technical / Diploma	-0.034	-2.02	-0.040	-2.67
Trade	-0.038	-1.69	-0.041	-2.05
12 + Years of Schooling	-0.070	-3.83	-0.075	-4.65
10-11 Years Schooling	-0.086	-3.79	-0.100	-5.04
7-9 Years of Schooling	-0.070	-2.85	-0.072	-3.38
6 - Years of Schooling	-0.075	-2.77	-0.088	-3.72
Speaks English well	-0.010	-0.90	-0.010	-0.97
Speaks English not well	-0.005	-0.39	-0.008	-0.67
Speaks English notat all	0.028	1.39	0.025	1.42
Visa Pref Family	0.036	3.73	0.041	4.80
Visa Con Family	-0.011	-0.75	-0.012	-0.99
Visa Bus Skills	-0.042	-2.68	-0.047	-3.31
Visa Independent	-0.049	-2.61	-0.070	-4.19
Female |	-0.020	-1.23	-0.032	-2.16
Europe & USSR	0.116	3.50	0.118	3.82
Middle East North Africa	0.123	3.54	0.114	3.56
Southeast Asia	0.045	1.33	0.050	1.57
Northeast Asia	0.117	3.29	0.111	3.42
Southern Asia	0.079	2.24	0.074	2.29
Northern America	0.124	2.83	0.119	3.05
South America	0.123	3.30	0.111	3.26
Africa	0.131	3.66	0.128	3.88
Income 1 to 8000	-0.079	-1.79	-0.067	-1.84
Income 8001 to 16000	-0.067	-1.68	-0.068	-2.09
Income 16001 to 25000	-0.067	-1.69	-0.066	-2.05
Income 25001 to 35000	-0.073	-1.85	-0.071	-2.21
Income 35001 to 50000	-0.095	-2.39	-0.083	-2.58
Income >50000	-0.097	-2.46	-0.093	-2.90
Income NA	-0.081	-2.05	-0.075	-2.35
Intercept	-0.305	-4.16	-0.282	-4.41
No of Obs	14268		17860	
Log likelihood	-7136		-9214	

* Omitted categories; Out of the labour force, Married, No Kids, Higher Degree, English Speaking or speaks English very well, Visa Humanitarian, Oceania, Income – none, Wave 1.

Table B.5a

Labour Force Status Regressions: Dependent variable Labour Force Status in Wave 2 - Base Case Employment Wave 2 - Condition Wave1 = Employed (Multinomial Logit Regressions)

	Outcome - Unemployment		Outcome – Out of LF	
Variables	Coefficients	t statistic	Coefficients	t statistic
GHQ = 0	0.01	0.02	-0.55	-2.40
GHQ = 1	0.31	0.70	-0.35	-1.24
GHQ = 2	-0.58	-0.84	-0.65	-1.80
Age	-0.06	-0.54	-0.20	-2.90
Agesq	0.00	0.54	0.00	3.00
Bachelor Degree	0.85	1.76	0.17	0.59
Technical / Diploma	0.55	1.08	-0.15	-0.49
Trade	0.07	0.11	-0.11	-0.26
12 + Years of Schooling	0.68	1.15	0.04	0.11
10-11 Years Schooling	1.70	2.91	-0.19	-0.43
7-9 Years of Schooling	0.42	0.48	-0.15	-0.30
6 - Years of Schooling	1.98	2.76	-1.30	-1.20
Speaks English well	0.61	1.99	0.81	3.87
Speaks English not well	1.11	2.90	1.73	6.74
Speaks English notat all	0.85	0.95	-33.38	0.00
Visa Pref Family	-0.27	-0.52	0.03	0.07
Visa Con Family	-0.34	-0.60	-0.26	-0.57
Visa Bus Skills	-0.90	-1.44	-0.58	-1.21
Visa Independent	-0.01	-0.02	-0.62	-1.31
Female	-0.19	-0.65	1.59	8.32
Constant	-3.01	-1.38	0.40	0.29
No of Obs	2235			
Log Likelihood	-753			

* Omitted categories: GHQ = 3 or more, Higher Degree, English Speaking or speaks English very well, Visa Humanitarian.

Table B.5b

Labour Force Status Regressions: Dependent variable Labour Force Status in Wave 2 - Base Case Employment Wave 2 - Condition Wave1 = Unemployed (Multinomial Logit Regressions)

	Outcome - Unemployment		Outcome – Out of LF	
Variables	Coefficients	t statistic	Coefficients	t statistic
GHQ = 0	0.26	1.51	-0.05	-0.29
GHQ = 1	0.33	1.58	-0.01	-0.05
GHQ = 2	0.26	1.01	0.03	0.12
Age	0.02	0.30	-0.19	-3.58
Agesq	0.00	0.21	0.00	4.11
Bachelor Degree	-0.49	-2.33	-0.23	-0.99
Technical / Diploma	-0.36	-1.53	-0.10	-0.40
Trade	-0.58	-1.81	-0.72	-1.78
12 + Years of Schooling	-0.49	-1.89	-0.35	-1.24
10-11 Years Schooling	-0.53	-1.66	-0.50	-1.45
7-9 Years of Schooling	-0.36	-1.15	-0.90	-2.39
6 - Years of Schooling	-0.15	-0.36	-0.13	-0.29
Speaks English well	1.23	7.44	1.48	8.19
Speaks English not well	1.62	8.35	1.87	8.90
Speaks English notat all	1.48	2.70	2.37	4.35
Visa Pref Family	-0.58	-2.95	-0.30	-1.49
Visa Con Family	-0.36	-1.75	-0.44	-1.96
Visa Bus Skills	-1.45	-2.19	-0.10	-0.20
Visa Independent	-0.48	-2.10	-0.62	-2.39
Female	0.03	0.17	1.27	8.18
Constant	-1.71	-1.59	1.33	1.25
No of Obs	1447			
Log Likelihood	-1308			

* Omitted categories: GHQ = 3 or more, Higher Degree, English Speaking or speaks English very well, Visa Humanitarian.

Table B.5c

Labour Force Status Regressions: Dependent variable Labour Force Status in Wave 2 - Base Case Employment Wave 2 - Condition Wave1 = Out of Labour Force (Multinomial Logit Regressions)

	Outcome - Unemployment		Outcome – Out of LF	
Variables	Coefficients	t statistic	Coefficients	t statistic
GHQ = 0	0.25	1.32	0.12	0.96
GHQ = 1	0.30	1.30	0.10	0.66
GHQ = 2	0.62	2.23	0.26	1.38
Age	0.09	2.33	-0.09	-4.15
Agesq	0.00	-2.57	0.00	5.12
Bachelor Degree	-0.19	-0.74	-0.17	-0.99
Technical / Diploma	-0.25	-0.97	0.04	0.21
Trade	-0.76	-2.16	-0.57	-2.28
12 + Years of Schooling	-0.44	-1.63	-0.15	-0.87
10-11 Years Schooling	-0.17	-0.52	-0.07	-0.35
7-9 Years of Schooling	0.07	0.19	-0.19	-0.80
6 - Years of Schooling	-1.06	-2.69	-0.72	-2.93
Speaks English well	2.10	10.32	1.65	14.31
Speaks English not well	2.66	12.48	2.27	17.93
Speaks English notat all	3.15	7.31	2.95	9.58
Visa Pref Family	-0.26	-1.39	-0.09	-0.66
Visa Con Family	-0.02	-0.10	-0.27	-1.67
Visa Bus Skills	-1.14	-3.50	-0.06	-0.35
Visa Independent	-0.10	-0.38	0.40	2.27
Female	-0.35	-2.42	1.20	11.25
Constant	-3.71	-4.35	0.17	0.35
No of Obs	3207			
Log Likelihood	-2399			

* Omitted categories: GHQ = 3 or more, Higher Degree, English Speaking or speaks English very well, Visa Humanitarian.

Appendix C

Table C.1 presents mean GHQ scores for immigrants in wave 1 who could not be interviewed in wave 2 and wave 3. Mean GHQ scores were significantly higher for the attrition groups (people who could not be interviewed in all 3 waves) compared to those who could be interviewed in all 3 waves. This means that GHQ scores for wave 2 and wave 3 are likely to be biased downwards. However, a preliminary analysis of immigrants who could be interviewed in all 3 waves (of a balanced panel) indicates that the descriptive features of the data derived using all observations available (the unbalanced panel) remain.

Labour force status proportions are relatively stable between the different groups except for those who did not answer all GHQ questions in wave 1 where a large proportion of this group were employed.

Table C.1
Attrition Statistics

	All	**Answered all GHQ questions**	**Didn't Answer all GHQ questions**	**Out in Wave 2**	**Out in Wave 3**	**In for all 3 Waves**
Number of Obs	7029	6889	140	994	1920	4756
GHQ Mean (SD)	na	1.35 (2.26)	na	1.56 (2.46)	1.55 (2.44)	1.26 (2.17)
Employed (%)	33	32.4	60.7	30.3	31.3	33.1
Unemployed (%)	20.8	21	10.0	24	21.7	20.8
Out of labour Force (%)	46.2	46.6	29.3	45.7	47.2	46.2

Note, some immigrants who couldn't be interviewed in wave 2 were able to be interviewed in wave 3 therefore the number who could be interviewed in all 3 waves is less than wave 3 attrition subtracted from wave 1.

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